

# PERSONAL SAFETY

during

# LIGHTNING

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ISD



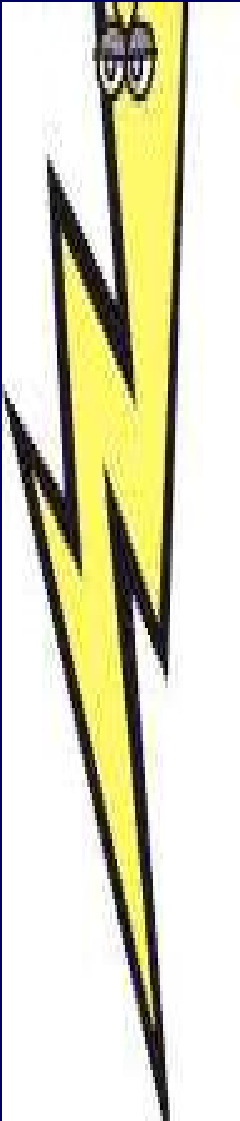
# Training Programmed Contents

- Lightning -Statistics and fundamentals
- **Myths & Facts**
- Un -Safe & Safe areas
- **Safety crouching position**
- Lightning Alert Instrument
- **Lightning safety rating**
- Lightning - First Aid Measures
- **Lightning Pre-Cursors**
- Lightning Evacuation program



# Lightning Accidents

- 2 engineers died while inspecting road construction in south India
- A boy was struck by lightning in a Texas football field but survived
- Parents killed, 3 children injured when they sought shelter under an isolated tree
- 3 men struck by lightning while installing a chain link fence
- 2 caddies die of lightning on a golf course



# Lightning - Facts

- Virtually anything can get struck by lightning!
  - Tree / Animal / Humans / Building / Aircraft / Ship / Bush / Light pole / Process Plant / Crane / Truck
- Lightning strikes are absolutely **UN-PREDICTABLE!!!!**
  - Place of strike / Intensity / Destruction Potential
- Lightning discharges produces very high current!!
  - **Kilo Amperes**



# Lightning - Facts

- **25% of Lightning victims die!**
- **Lightning damage probability is more in summer**
- **85% of the lightning strike victims are children and young men (10 to 35 ) engaged in work & recreation**
- **14 % of lightning strike deaths are under trees**
- **70% of strikes happen between June & August**



# Lightning - Facts

- Most lightning strikes occur between 2 pm to 6 pm.
- **Lightning strikes are UN-Predictable!**
  - During a football match, one team of 11 were struck by lightning whereas the other team was untouched!



# Lightning Trivia

What you don't know can kill you!

Average potential:  
100,000,000 volts

Average electrical  
outlet: 110 volts

Average charge:  
30,000 amps

Average household  
appliance:  
less than 10 amps

Heats surrounding air to  
50,000 deg F



Can strike up to 25 miles  
away from the storm

Most thunder inaudible beyond  
10 miles

# Lightning Trivia

- . There are some 22 million cloud-to-ground lightning flashes in the USA annually.
- Lightning travels at about 1000 feet in a millionth of a second.
- Lightning follows Benjamin Franklin's maxim of Path of Least Resistance through the air and along or through the ground.





# Lightning Trivia

According to insurance information, the ratio of damage due to indirect effects vs. direct effects is a ratio of some 2000:1. This means that if lightning strikes the ground near to an indoor pool, depending upon localized circumstances, it may be conducted into the building via low resistance conductors. These can be:



# Lightning Trivia



**Buried or Pole-Mounted Telephone and Electric Wires**



**Fences which are Contiguous to the Building**



**Metal Light Masts in Parking Lots with AC Power Fed from the Building**

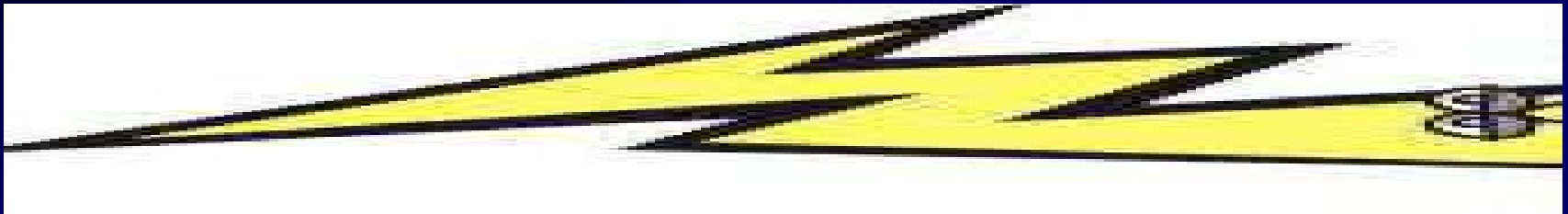
**Buried Metal Water Lines  
or Gas Lines**

# Lightning Trivia

**Cable TV Lines, both Aerial and Buried**

**Root Systems of Nearby Trees**

**Wet Ground and Wet Paved Parking Lots (from rain)  
adjacent to Buildings**



# Lightning Trivia

There are no known deaths to persons in indoor pools, however Observable lightning effects inside pool buildings have included: main circulation pump destroyed; injuries to employees touching electrical panels; concrete footing of slide blown apart; and visible lightning inside The natatorium.



# The 30/30 Rule

- When the flash is seen, count the number of seconds to the initial “bang” of its thunder.
- Divide the number of seconds by 5 to get the strike distance (in miles).
- Take shelter if the “Flash-to-Bang” delay is 30 seconds or less
- Stay undercover until 30 minutes past the last clap of thunder.
- *LIMITED EFFECT WITH STORMS BUILDING OVERHEAD*



# Lightning Myth - 1

- Lightning strikes only on tall objects!
- But the probability of tall objects getting struck is more prevalent In African animal parks than anywhere else



More **Giraffes** get hit and die from lightning strikes than any other animal in the world!

# Lightning Myth - 2

- Lightning Never strikes the same place twice!
- EMPIRE STATE BUILDING WAS STRUCK 25 TIMES in one storm!!!!



# Lightning Myth - 3

- Standing under a tree during lightning is safe!

DUH!





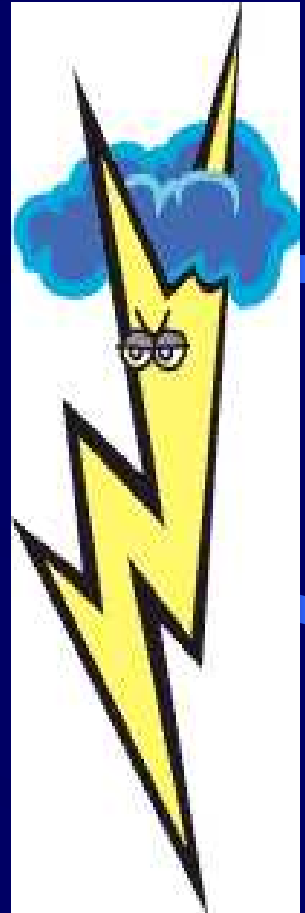
# Lightning Myth - 4

- You are completely safe inside a metal bodied car!
- **Not completely true!** So long as you stay inside, and touch no metal you may be safe.
- **DONOT STEP OUT!** Safest thing to do is not to get into any vehicle.



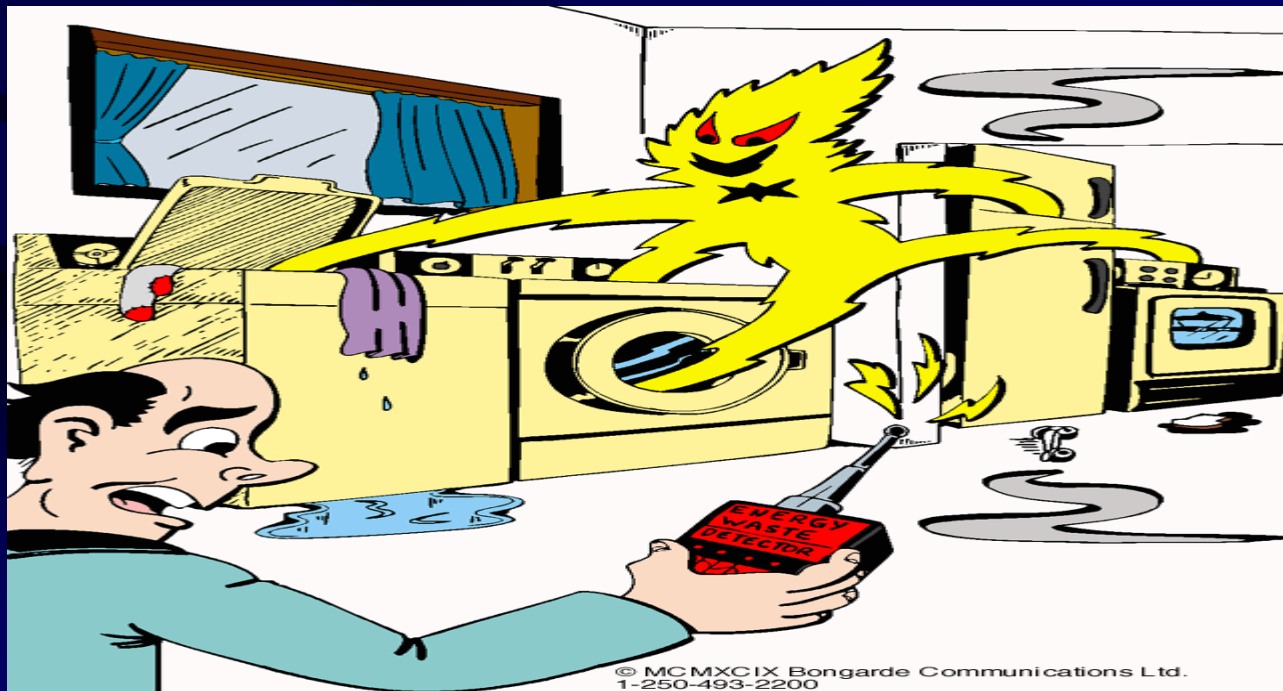
# UNSAFE AREAS

- Small structures including huts & rain shelters.
- Nearby metallic objects like fences, gates, instrumentation and electrical equipment, wires, and power poles.
- Also---**AVOID** isolated trees, **AVOID** water, **AVOID** open fields, **AVOID** using the (hard wired) telephone and headsets.
- Avoid being in or near high places (tanks / towers / stacks) or open fields or under isolated trees, under communication towers, flagpoles, metal fences, rivers



# UNSAFE AREAS

- When inside a building, avoid use of the telephone, taking a shower, washing your hands, electrical wiring, cable TV wiring, plumbing, Appliances, being near windows & stay off balconies



# UNSAFE AREAS

- Parking lots / Tennis Courts / Golf Courses / athletic fields / tents & temporary structures
- Near clotheslines, wire fences, overhead wires and rail-road tracks



# SAFE AREAS

- Large metal-framed & enclosed structures
- Lightning protected buildings
- Fully enclosed metal vehicles, with rolled-up windows (avoid contact with metal surfaces outside or inside the vehicle)
- City Streets shielded by nearby buildings
- Underground shelters such as tunnels, caves
- Seek depressed areas / dense woods
- **Do not go out-of-doors or remain out, unless it is necessary**

# LIGHTNING SAFETY

## CROUCH

- If hopelessly isolated from shelter during close-in lightning, adopt a low crouching position with heels together and hands on ears (**Crouching**).

Maintain lowest possible height

# LIGHTNING SAFETY CROUCH

**Lightning Crouch - LAST RESORT!**





# Hair Rising!!!



This photograph of individuals with their hair standing on end is an indication that lightning is about to strike. This hair-raising slide was taken at Moro Rock in California's Sequoia National Park.)



# Lightning



# Hair Rising!!!



Moments after this picture was taken these two people stepped aside, another person occupied the same spot, was struck and killed by lightning. (NOAA)/NWS

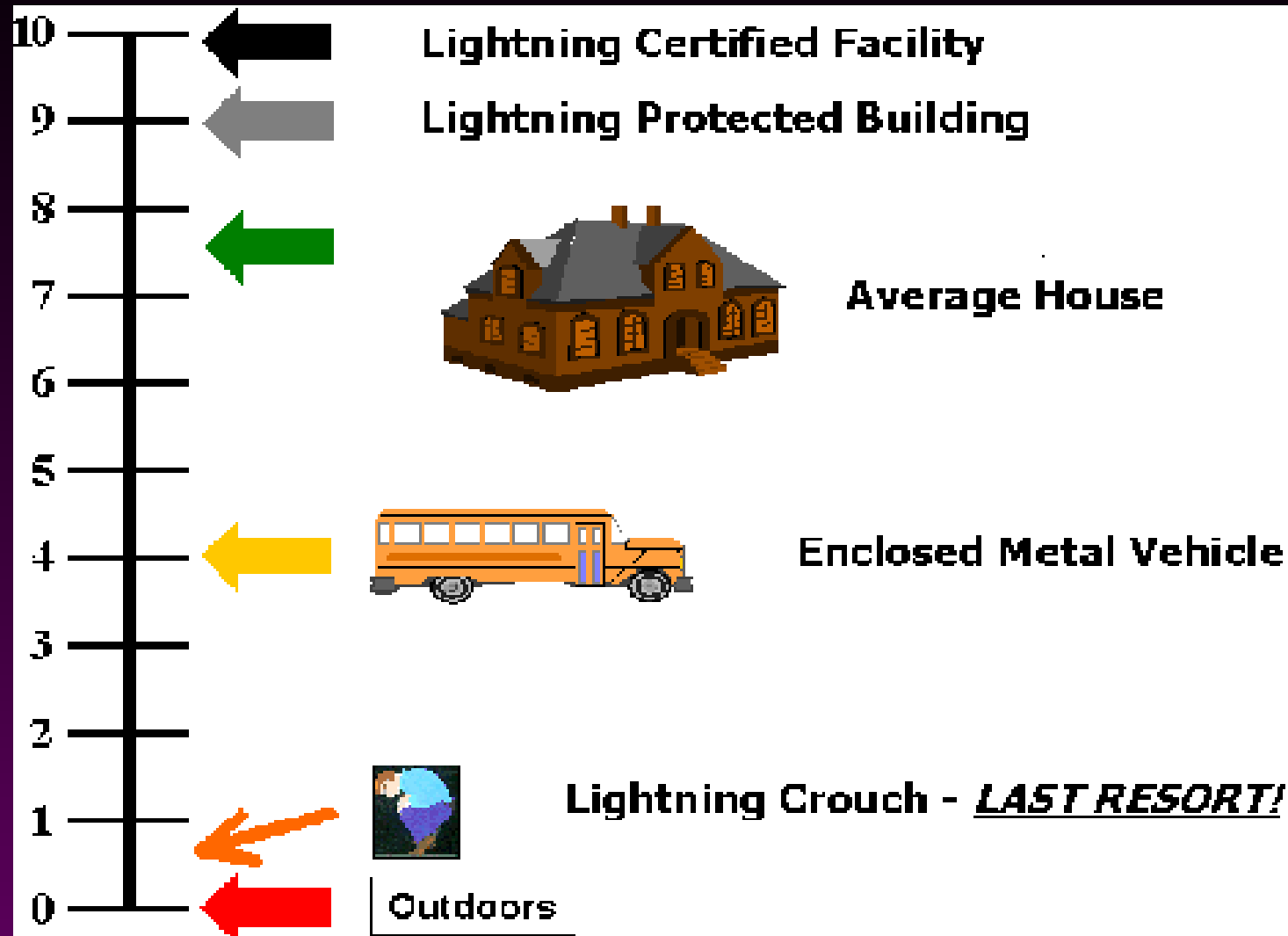
# Lightning Safety Rating

- In order of descending safety where 10 is the best
- Lightning Certified Safe Shelter, Rating = (10)
- Lightning Protected Building, Rating = (9)
- Large enclosed substantially constructed building (the center of a low level interior room is better).  
Rating = (7)
- An enclosed metal car, bus, airplane, train or tractor,  
Rating = (3)
- The safety crouch position rating = (1/2)
- Outdoors, Rating = (0)

# Lightning



# Where to Go



# Lightning



# Lightning *Safe Alert*

- **Personal Lightning Detector**

Provides early warning of approaching lightning strikes from as far away as 40 miles



- Cost USD \$80 +/-

- An audible alarm sounds when there's a strike and a corresponding LED illuminates accordingly at lightning distances of 20-40 miles, 12 - 24 miles, 6 - 12 miles and within 6 miles.



Source: <http://www.weplay.com/lightning/>

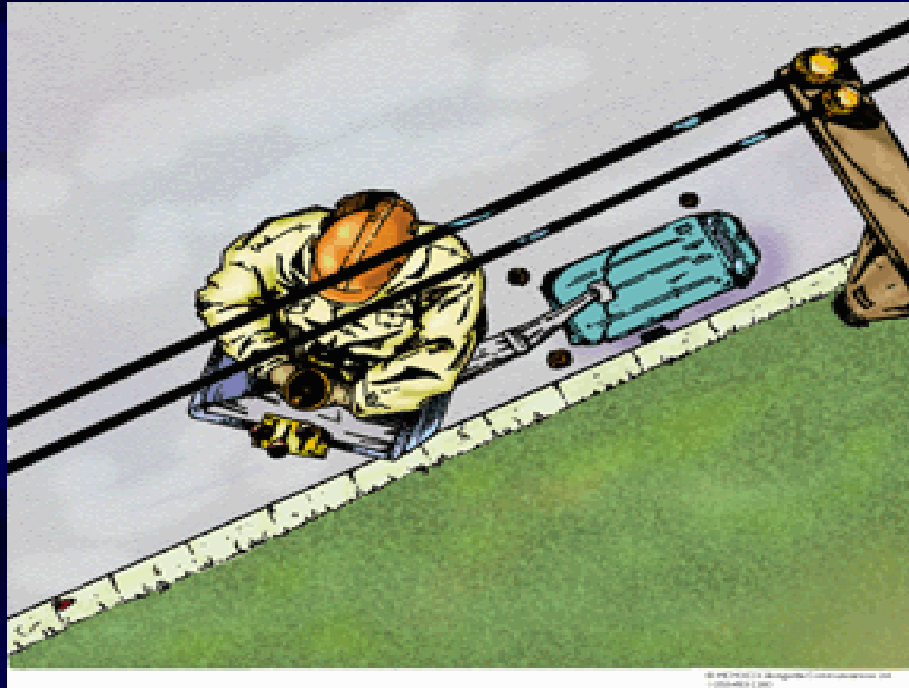
# Lightning





# Outdoor Lightning Safety Tips

- People who are working at heights should climb down and take shelter



- Depend on the radio to keep updated on weather conditions

# Outdoor Lightning Safety Tips

- If you hear **thunder**, suspend all outdoor activities!
- If you see **Lightning**, seek a shelter immediately!
- **Vehicles:**
  - Cranes - lower boom, stop operations and the driver should get out of the vehicle and move into a shelter
  - All trucks - Drivers to stop work, move into a shelter



# Lightning Pre-Cursors (Warning Signals)

- High Winds
- Heavy Rainfall
- Cloud cover / Cloudy Sky

Use lightning warning devices if possible/available



**“Many casualties occur because people ignore these obvious precursors”**

# Outdoor Lightning Safety Tips

- Avoid unnecessary exposure to lightning
- (go out only if absolutely essential!!!)



# First Aid Recommendations

- If some one gets struck
- Re-locate the victim to a low lightning risk area
- Start resuscitation, if the victim is not breathing
- If no pulse is detected, CPR and call 911
- Get to an Emergency room ASAP

Most lightning victims can actually survive their encounter with lightning, especially with timely medical treatment



Being aware of lightning hazards  
itself is a big step towards lightning  
safety!!!!

# Lightning Quiz

- 1. People struck by lightning carry an electrical charge and should not be touched.**
- 2. A person can be struck by lightning even when it is not raining.**
- 3. The rubber tires on your car will protect you from being struck by lightning.**

# Lightning



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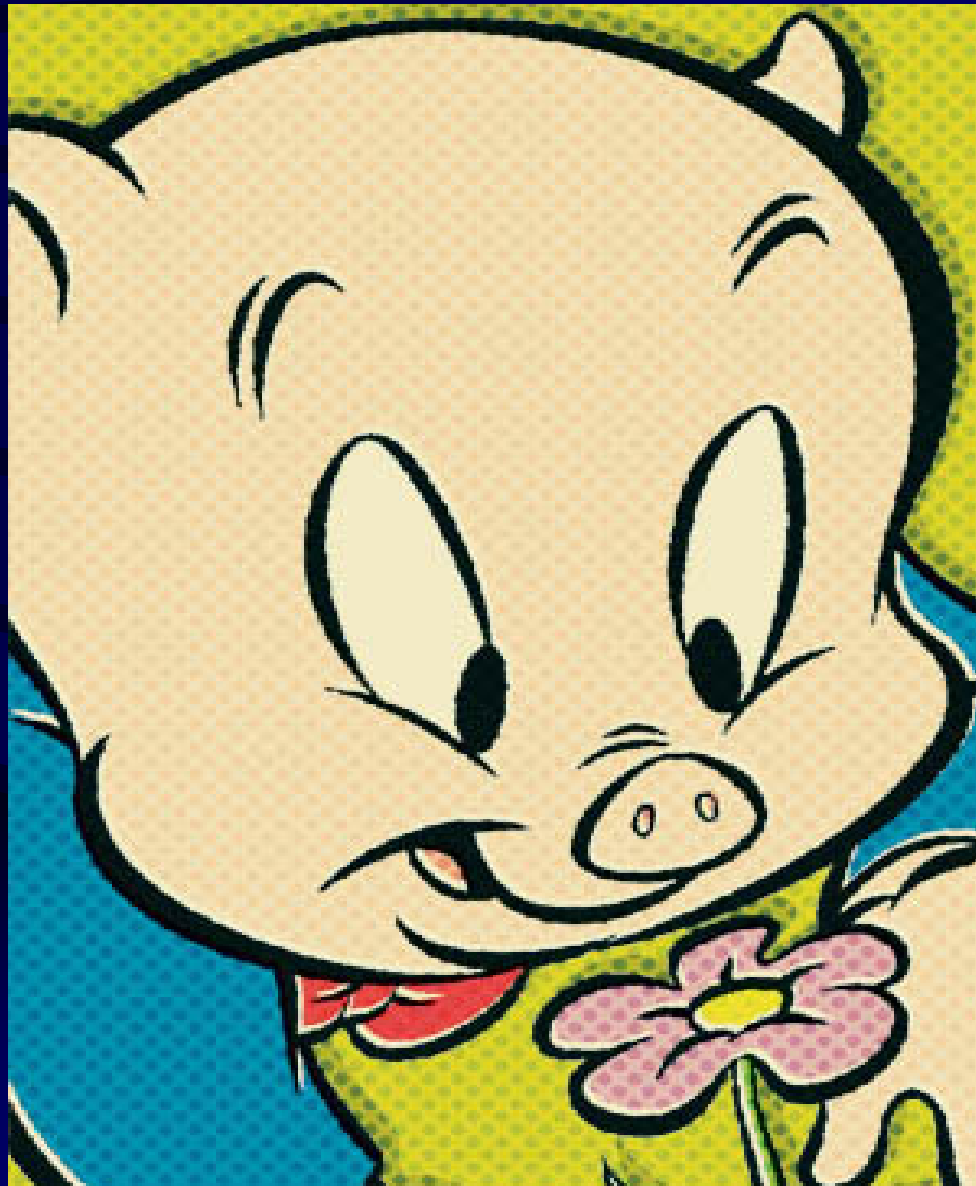


# Lightning Quiz

- 4. Most people who are struck by lightning survive.
- 5. Lightning can enter a house through the telephone line.
- 6. Lightning cannot hit the same spot twice.
- 7. Lightning rods prevent lightning strikes.

# The End

That's  
All



Folks